

REMARKS

The Office Action dated June 3, 2004 has been carefully reviewed. Claims 1-34 were rejected in the 6/3/04 Office Action. By this amendment, claims 26 and 31 have been amended, and claim 30 has been cancelled.

35 U.S.C. § 102(b) Rejections - Branvold

Claims 26-28 and 30-33 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 3,584,850 issued to Branvold (hereinafter "Branvold"). Claim 30 has been cancelled. Applicants respectfully traverse the rejection of the remaining claims. Reconsideration of claims 26-28 and 31-33 is respectfully requested.

Discussion Re: Patentability of Claim 26

Claim 26, as amended, is as follows:

26. A mineral processing kiln, comprising:
an inclined rotary vessel having a lower end and an upper end, the rotary vessel having an air inlet opening defined therein at a location between the upper end and the lower end thereof,
a preheating/precalcining assembly positioned proximate to the upper end of the rotary vessel such that mineral passes through the preheating/precalcining assembly prior to advancement into the rotary vessel,
a stationary hood positioned proximate to the lower end of the rotary vessel, and
a burner positioned proximate to the lower end of the rotary vessel.

Hence, claim 26 is directed to those mineral kilns commonly referred to in the art as preheating/precalcining kilns, as opposed to, for example, those kilns commonly referred to as long kilns. The Examiner has pointed to a long kiln in FIGS. 1-4 of Branvold in an attempt to find each limitation of originally filed claim 26. In an attempt to identify a structure relating to the limitation of claim 26 relating to "a preheating/precalcining assembly," the Examiner has identified only the rotary kiln generally (i.e., by the Examiner's use of the reference numeral 14). Apparently the Examiner believes that some portion or zone of the rotary kiln itself equates to a "preheating/precalcining assembly". Applicants submit that such a term of art (i.e., a

preheating/precalcining assembly) is clearly distinct from any structure on the conventional long kiln of FIGS. 1-4 of Branvold. However, to further clarify this term, Applicants have amended claim 26 to recite "a preheating/precalcining assembly positioned proximate to the upper end of the rotary vessel such that mineral passes through the preheating/precalcining assembly prior to advancement into the rotary vessel." This minor amendment more clearly defines the kiln of claim 26 as a preheating/precalcining kiln, thereby distinguishing the claim 26 from the long kiln of FIGS. 1-4 of Branvold relied upon by the Examiner since the long kiln of Branvold does not have such an assembly.

Note also that claim 26 was amended to correct minor typographical errors in lines 7 and 9 of the originally-filed claim.

Since Branvold does not disclose each and every element of Applicants' claim 26, Branvold does not anticipate Applicant's claim 26.

Discussion Re: Patentability of Claims 27 and 28

Both of claims 27 and 28 include claim 26 as a base claim. As a result, both of claims 27 and 28 are allowable for the reasons hereinbefore discussed with regard to claim 26.

Discussion Re: Patentability of Claim 31

The discussion relating to the patentability of claim 26 is relevant to the patentability of claim 31. For example, claim 31 includes the limitation "a mineral feed assembly operable to heat lime mineral and thereafter advance the lime mineral into the upper end of the rotary vessel...". As a result, claim 31 is allowable for the reasons hereinbefore discussed with regard to claim 26. Note also that claim 31 was amended to correct minor typographical errors in lines 7 and 9 of the originally-filed claim.

Discussion Re: Patentability of Claims 32 and 33

Both of claims 32 and 33 include claim 31. Claims 32 and 33 are allowable for the reasons hereinbefore d

35 U.S.C. § 102(b) Rejections - Tutt

Claims 26-28 and 30-33 were rejected under 5,375,535 issued to Tutt (hereinafter "Tutt"). Applicants' claims 26-28 and 31-33.

Discussion Re: Patentability of Claim 26

The discussion relating to the patentability of Branvold is relevant to the patentability of claim 26 in regard to Tutt, as its title implies, is directed to long kilns. The "preheating/precalcining assembly" as recited in claim 26. Every element of Applicants' claim 26, Tutt does not anticipate.

Discussion Re: Patentability of Claims 27 and 28

Both of claims 27 and 28 include claim 26. Claims 27 and 28 are allowable for the reasons hereinbefore.

Discussion Re: Patentability of Claim 31

The discussion relating to the patentability of claim 31. For example, claim 31 includes the limitation heat lime mineral and thereafter advance the lime mineral is. As a result, claim 31 is allowable over Tutt for the reasons claim 26.

Discussion Re: Patentability of Claims 32 and 33

Both of claims 32 and 33 include claim 31 as a base claim. As a result, both of claims 32 and 33 are allowable for the reasons hereinbefore discussed with regard to claim 31.

35 U.S.C. § 102(b) Rejections - Tutt

Claims 26-28 and 30-33 were rejected under 35 U.S.C. §102(b) over U.S. Patent No. 5,375,535 issued to Tutt (hereinafter "Tutt"). Applicants respectfully traverse such a rejection of claims 26-28 and 31-33.

Discussion Re: Patentability of Claim 26

The discussion relating to the patentability of claim 26 in regard to its rejection over Branvold is relevant to the patentability of claim 26 in regard to its rejection over Tutt. Specifically, Tutt, as its title implies, is directed to long kilns. The long kilns of Tutt do not include a "preheating/precalcining assembly" as recited in claim 26. Since Tutt does not disclose each and every element of Applicants' claim 26, Tutt does not anticipate Applicant's claim 26.

Discussion Re: Patentability of Claims 27 and 28

Both of claims 27 and 28 include claim 26 as a base claim. As a result, both of claims 27 and 28 are allowable for the reasons hereinbefore discussed with regard to claim 26.

Discussion Re: Patentability of Claim 31

The discussion relating to the patentability of claim 26 is relevant to the patentability of claim 31. For example, claim 31 includes the limitation "a mineral feed assembly operable to heat lime mineral and thereafter advance the lime mineral into the upper end of the rotary vessel...". As a result, claim 31 is allowable over Tutt for the reasons hereinbefore discussed with regard to claim 26.

Discussion Re: Patentability of Claims 32 and 33

Both of claims 32 and 33 include claim 31 as a base claim. As a result, both of claims 32 and 33 are allowable for the reasons hereinbefore discussed with regard to claim 31.

35 U.S.C. § 103 Rejections - Branvold

Claims 1-25, 29, and 34 were rejected under 35 U.S.C. §103(a) over Branvold. Applicants respectfully traverse this rejection. Reconsideration of claims 1-25, 29, and 34 is respectfully requested.

Discussion Re: Patentability of Claim 1

Claim 1 is as follows:

1. A method of operating a mineral processing kiln having an inclined rotary vessel, the method comprising the steps of:
introducing combustion air and combustible fuel in a sub-stoichiometric ratio through a lower end of the rotary vessel, and
introducing additional combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and an upper end of the rotary vessel.

In the 6/3/04 Office Action, the Examiner concedes that Branvold does not teach such a method, but asserts that "[t]o operate the combustion rate at a sub-stoichiometric ratio at the lower end and super-stoichiometric at the upper end is merely an obvious matter of fuel and air adjustment." The Examiner further indicates that "[t]his is well known in the combustion art." Apparently, in an attempt to arrive at the invention of Applicants' claim 1, the Examiner is modifying the kiln of Branvold to operate at the specific parameters recited in Applicants' claim 1. It is a fundamental tenet of patent law that a prima facie case of obviousness cannot be established in the absence of some teaching, motivation, or suggestion supporting the modification or combination of the references relied upon in making the rejection. The rule of law for a finding of obviousness under 35 U.S.C. § 103(a) was reiterated recently by the Court of Appeals for the Federal Circuit as follows, "[w]hen patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or

suggestion to select and combine the references relied on as evidence of obviousness." In re Lee, 277 F.3d 1338 at 1343, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002); See also McGinley v. Franklin Sports, Inc., 262 F.3d 1339 at 1351-52, 60 USPQ2d 1001 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors). The Federal Circuit expounded upon the necessity of finding some teaching or motivation to combine the references *in the references themselves* concluding that "[t]he factual inquiry whether to combine references must be thorough and searching." In re Lee, 61 U.S.P.Q.2d at 1433 (Fed. Cir. 2002). The teaching or suggestion to make the claimed combination *must be found in the prior art*, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

In an apparent attempt to establish a case of obviousness in the present case, the Examiner stated that "[t]his is well known in the combustion art." However, this conclusory statement is completely devoid of any legally sufficient teaching, motivation, or suggestion to modify Branvold in the manner proposed by the Examiner. This unsupported, conclusory statement offered by the Examiner is not a legally sufficient substitution for the factual analysis clarified and confirmed in *Lee*. It is the Examiner's burden to point to such motivation, and the Examiner has not done so. However, if the Examiner sustains such rejection, the Applicant respectfully requests that the Examiner point with particularity to the section of Branvold wherein such motivation is provided.

Furthermore, not only has the Examiner not offered a legally sufficient teaching, motivation, or suggestion to modify Branvold, it is believed that no such motivation exists. Indeed, even if it could be supported with a legally sufficient teaching, motivation, or suggestion, Applicants

respectfully disagree with the Examiner's assertion that "[t]o operate the combustion rate at a sub-stoichiometric ratio at the lower end and super-stoichiometric at the upper end is merely an obvious matter of fuel and air adjustment." In particular, Applicants argue that at the time of Applicants' invention, it was commonly believed that injections of unheated air into the cement process downstream of the cooler and the resulting displacement of air from the cooler will result in unacceptable loss of heat recovery. On closer examination by Applicants, calculations revealed that such loss of heat recovery is minimal, especially in view of the benefits of mixing the process gases in high temperature zones. Calculations show that if 10% of the theoretical combustion air is introduced with high energy into the rotary kiln, the displacement of a corresponding mass of preheated air would result in a reduction of the heat recovery from the cooler of less than 2% of the total energy input. The potential gain in process efficiency due to elimination of stratification can more than offset this heat loss. Moreover, by use of such a mixing air substitution scheme, the primary combustion zone at the lower end of the rotary vessel can be operated at a sub-stoichiometric air-to-fuel ratio thereby creating an environment that favorably destroys NO_x produced in the high temperature rotary kiln and pass through the precalciner/preheater. For at least these reasons, the Examiner's proposed modification of Branvold cannot be properly construed as "merely an obvious matter of fuel and air adjustment."

As a result, the Examiner has not established a prima facie case of obviousness with Branvold in regard to Applicants' claim 1.

Discussion Re: Patentability of Claims 2-6

Each of claims 2-6 includes claim 1 as a base claim. As a result, each of claims 2-6 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claim 7

The discussion relating to the patentability of claim 1 is relevant to the patentability of claim 7. For example, claim 7 includes the limitations:

introducing combustion air and combustible fuel in a sub-stoichiometric ratio through the lower end of the rotary vessel, and
introducing additional combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and the upper end of the rotary vessel.

As a result, claim 7 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claims 8-13

Each of claims 8-13 includes claim 7 as a base claim. As a result, each of claims 8-13 is allowable for the reasons hereinbefore discussed with regard to claim 7.

Discussion Re: Patentability of Claim 14

The discussion relating to the patentability of claim 1 is relevant to the patentability of claim 14. For example, claim 14 includes the limitations:

advancing a first quantity of combustion air into the lower end of the rotary vessel to create sub-stoichiometric conditions in the lower end of the rotary vessel, and
advancing a second quantity of combustion air into the rotary vessel, at a location between the lower end of the rotary vessel and an upper end of the rotary vessel, to create super-stoichiometric conditions in a mid-portion of the rotary vessel.

As a result, claim 14 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claims 15-18

Each of claims 15-18 includes claim 14 as a base claim. As a result, each of claims 15-18 is allowable for the reasons hereinbefore discussed with regard to claim 14.

Discussion Re: Patentability of Claim 19

Claim 19 is as follows:

19. A method of operating a preheater/precalciner kiln having an inclined rotary vessel, the method comprising the steps of:
advancing mineral from a preheater/precaliner assembly into an upper end of the inclined rotary vessel,
advancing mineral from the upper end of the rotary vessel to a lower end of the inclined rotary vessel,
introducing a first quantity of combustion air and combustible fuel through the lower end of the rotary vessel, and
introducing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and the upper end of the rotary vessel.

Hence, claim 19 is directed to a method of operating a preheating/precalcining kiln.

The Examiner has not proposed a modification of Branvold which arrives at the invention of claim 19. In particular, the Examiner has not identified a location in Branvold, or any other reference, which discloses each of the steps of claim 19. For example, the 6/3/04 Office Action is devoid of any discussion relating to a method of operating a preheater/precalciner kiln which includes the steps of: "advancing mineral from a preheater/precaliner assembly into an upper end of the inclined rotary vessel" and "introducing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and the upper end of the rotary vessel". As such, a prima facie case of obviousness has not been established in regard to claim 19.

Moreover, even if the proposed modification of Branvold could be construed to arrive at the invention of claim 19, the Examiner has provided literally no teaching, motivation, or suggestion for modifying Branvold in such a manner. A prima facie case of obviousness cannot be established in the absence of a legally sufficient teaching, motivation, or suggestion.

Discussion Re: Patentability of Claims 20-25

Each of claims 20-25 includes claim 19 as a base claim. As a result, each of claims 20-25 is allowable for the reasons hereinbefore discussed with regard to claim 19.

Discussion Re: Patentability of Claim 29

Claim 29 includes claim 26 as a base claim. As a result, claim 29 is allowable for the reasons hereinbefore discussed with regard to claim 26.

Discussion Re: Patentability of Claim 34

Claim 34 includes claim 31 as a base claim. As a result, claim 34 is allowable for the reasons hereinbefore discussed with regard to claim 31.

35 U.S.C. § 103 Rejections - Tutt

Claims 1-25, 29, and 34 were rejected under 35 U.S.C. §103(a) over Tutt. Applicants respectfully traverse this rejection. Reconsideration of claims 1-25, 29, and 34 is respectfully requested.

Discussion Re: Patentability of Claim 1

The discussion relating to the patentability of claim 1 in regard to its rejection over Branvold is relevant to the patentability of claim 1 in regard to its rejection over Tutt. Specifically, in a similar manner as to the purported obviousness rejections over Branvold, the Examiner has provided no legally sufficient teaching, motivation, or suggestion to support the proposed modification of the kilns disclosed in Tutt. Moreover, Applicants are of the belief that no teaching, motivation, or suggestion exists for reasons similar to as described above in regard to the obviousness rejection over Branvold. Since Tutt has not been applied in a manner to create a prima facie case of obvious, claim 1 is not obvious over Tutt.

Discussion Re: Patentability of Claims 2-6

Each of claims 2-6 includes claim 1 as a base claim. As a result, each of claims 2-6 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claim 7

The discussion relating to the patentability of claim 1 is relevant to the patentability of claim 7. For example, claim 7 includes the limitations:

introducing combustion air and combustible fuel in a sub-stoichiometric ratio through the lower end of the rotary vessel, and

introducing additional combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and the upper end of the rotary vessel.

As a result, claim 7 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claims 8-13

Each of claims 8-13 includes claim 7 as a base claim. As a result, each of claims 8-13 is allowable for the reasons hereinbefore discussed with regard to claim 7.

Discussion Re: Patentability of Claim 14

The discussion relating to the patentability of claim 1 is relevant to the patentability of claim 14. For example, claim 14 includes the limitations:

advancing a first quantity of combustion air into the lower end of the rotary vessel to create sub-stoichiometric conditions in the lower end of the rotary vessel, and

advancing a second quantity of combustion air into the rotary vessel, at a location between the lower end of the rotary vessel and an upper end of the rotary vessel, to create super-stoichiometric conditions in a mid-portion of the rotary vessel.

As a result, claim 14 is allowable for the reasons hereinbefore discussed with regard to claim 1.

Discussion Re: Patentability of Claims 15-18

Each of claims 15-18 includes claim 14 as a base claim. As a result, each of claims 15-18 is allowable for the reasons hereinbefore discussed with regard to claim 14.

Discussion Re: Patentability of Claim 19

The discussion relating to the patentability of claim 19 in regard to its rejection over Branvold is relevant to the patentability of claim 19 in regard to its rejection over Tutt. Specifically, the Examiner has not proposed a modification of Tutt which arrives at the invention of claim 19.

For example, the Examiner has not identified a location in Tutt, or any other reference, which discloses a method of operating a preheater/precalciner kiln which includes the steps of: "advancing mineral from a preheater/precaliner assembly into an upper end of the inclined rotary vessel" and "introducing a second quantity of combustion air through an opening in a wall of the rotary vessel at a location between the lower end of the rotary vessel and the upper end of the rotary vessel". As such, a prima facie case of obviousness has not been established in regard to claim 19.

Moreover, even if the proposed modification of Tutt could be construed to arrive at the invention of claim 19, the Examiner has provided literally no teaching, motivation, or suggestion for modifying Tutt in such a manner. A prima facie case of obviousness cannot be established in the absence of a legally sufficient teaching, motivation, or suggestion.

Discussion Re: Patentability of Claims 20-25

Each of claims 20-25 includes claim 19 as a base claim. As a result, each of claims 20-25 is allowable for the reasons hereinbefore discussed with regard to claim 19.

Discussion Re: Patentability of Claim 29

Claim 29 includes claim 26 as a base claim. As a result, claim 29 is allowable for the reasons hereinbefore discussed with regard to claim 26.

Discussion Re: Patentability of Claim 34

Claim 34 includes claim 31 as a base claim. As a result, claim 34 is allowable for the reasons hereinbefore discussed with regard to claim 31.

Conclusion

In view of the foregoing amendments and remarks, it is submitted that this application is in a condition for allowance. Action to that end is hereby solicited.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and shortages in other fees be charged, or any overpayment in fees be credited, to the Account of Barnes & Thornburg, Deposit Account No. 10-0435 with reference to file 204560-73806.

Respectfully submitted,
BARNES & THORNBURG



Shawn D. Bauer
Attorney Reg. No. 41,603

SDB/kim
Indianapolis, IN
(317) 231-7313

INDS02 SDB 692740v1